

31. *CEPHALOPHUS MONTICOLA* Thumb.

♂. 1858, 1859. ♀. 1881.

"Native name, 'Nyakoro.'

"Common in the forest, and often observed in pairs, but never more together.

"Generally can only be shot in the early morning and late afternoon, when they are feeding.

"They are extremely wary, the alarm-cry is a sharp whistle, almost a shriek."

32. *CERVICAPRA ARUNDINUM* Bodd.

1937.

"Native name, 'Sengo.'"

33. *TRAGELAPHUS SCRIPTUS* Pall.

♂. 1949 (juv.). ♀. 1908, 1833. Tambarara.

"Native name, 'Nsome.'"

2. Notes upon some Species and Geographical Races of Serows (*Capricornis*) and Gorals (*Nemorhedus*), based upon Specimens exhibited in the Society's Gardens. By R. I. Pocock, F.L.S., Superintendent of the Gardens*.

[Received March 2, 1908.]

(Text-figures 30-38.)

I. *Introduction.*

Serows and Gorals, which, as I have recently shown †, must be known scientifically as *Capricornis* and *Nemorhedus*, and not as *Nemorhedus* and *Urotragus* or *Kemas* respectively, are very rare animals in captivity. Within the last four years, however, the Zoological Society has had the good fortune to exhibit no fewer than two well-marked species or subspecies of each of these genera ‡. The necessity for determining these animals correctly involved the looking up of a good deal of the literature, especially the older literature, of the subject; and this brought to light a wholly unexpected amount of confusion in nomenclature, both generic and specific, and not a few mistakes and misconceptions as to specific characters in recent catalogues and treatises on these ruminants.

The specimens of the two kinds of Serow (*Capricornis*) exhibited

* [The complete account of the new species and subspecies described in this communication appears here; but, as the names and preliminary diagnoses were published in the 'Abstract,' the species and subspecies are distinguished here by the names being underlined.—EDITOR.]

† Ann. Mag. Nat. Hist. (8) i. pp. 183-188, 1908.

‡ Not including a young example of a third species of Goral from Nepal which was presented by the Prince of Wales, but lived only a few days after arrival.

in the Gardens came from widely separated localities—one from Kalimpong, near Darjiling, and the other from Selangor, in the Malay Peninsula. Identification of the former necessarily entailed examination of all the available material from the Himalayas, which resulted in the discovery of one or two undescribed forms. The Kalimpong specimen itself proves to be a representative of an unnamed local race, distinguishable from the typical Nepalese race described by Hodgson, the name of which has hitherto been applied to all the Serows of the Himalayas. For the opportunity to describe a second Himalayan race I am indebted to Major G. S. Rodon, F.Z.S., who very kindly sent to me the perfect skin and skull of a specimen shot by himself at Chamba. A third hitherto unnamed local race from these mountains is exemplified in the British Museum by a mounted head from Kashmir belonging to the Hume collection. Finally, the determination of the example from Selangor showed that it, too, was nameless, since it presented characters not previously recorded in any race of Serows. These characters I consider worthy of nominal recognition, when taken into consideration with the geographical distribution of the animal.

With regard to the two Gorals (*Nemorhedus*) the Society has lately exhibited, these belonged to two very distinct species. One of the specimens, which is still living, was presented to the Society by Major G. S. Rodon, F.Z.S., who brought it from Chamba; and I am indebted to Major Rodon for kindly sending to me for examination a series of skins of specimens shot in the same locality by His Highness the Maharajah of Chamba. The second specimen came from the mountains of Korea, whence Gorals have not been previously recorded, and was presented to the Society by Mr. C. F. S. Bilborough, F.R.G.S.

Although neither of these Gorals represents, in my opinion, an undescribed form, their determination revealed some hitherto unrecorded facts touching the nomenclature, variability, and distribution of some of the Gorals of North India and China.

II. *On the Serows (Capricornis) of the Himalayas, the Malay Peninsula, and Sumatra.*

Genus CAPRICORNIS Ogilby.

Nemorhedus Hamilton Smith, Griffith's Animal Kingdom, v. p. 352, 1827 (in part).

Capricornis Ogilby, P. Z. S. 1836, p. 138; Gray, List Mamm. B.M. pp. xxvi & 166, 1843; and subsequent works.

Nemorhedus Blanford, Fauna Brit. Ind., Mammalia, p. 512, 1891; Lydekker, Great and Small Game of India, p. 128, 1900, and id. *op. cit.* nov. ed. p. 139, 1907.

* *Capricornis* Heude, Hist. Nat. Chinois, ii. pp. 222 & 234, 1894.

Nemotragus + *Lithotragus* + *Austritragus*, id. *op. cit.* iv. pp. 13-14, 1898.

Capricornis Pocock, Ann. Mag. Nat. Hist. (8) i. pp. 183-188, 1908.

The principal external differences between the various kinds of Serows that have been described are differences of colour of a very simple kind. They consist, for the most part, in the substitution of the three tints, black, red, and white, on definite areas of the body and limbs—that is to say, a part which in one form is black may be red in a second and white or grey in a third. For example, the legs below the knees and hocks are white in *C. sumatraensis rodoni*, red in *C. s. milne-edwardsi*, and black in *C. s. swettenhami*. The mane is hoary white in *C. s. sumatraensis* and *C. s. argyrochetes*, red or mostly red in *C. s. rubidus*, black in *C. s. jamrachi*, a mixture of black and white in *C. s. robinsoni*, and of black, white, and red in *C. s. swettenhami*. Similarly the underside is almost wholly white in *C. s. rodoni*, and reddish black in *C. s. jamrachi*. Finally, the prevailing colour of the body in *C. s. jamrachi* is black, while in *C. s. rubidus* it is red. These three colours, black, red, and white, or a mixture of any two of them, or of the three combined, are the commonest variations to occur in domestic mammals. Horses, for example, may be black, red (bay), or white, or black and white (piebald), or bay and white (skewbald), when the colours are arranged in patches, or roan when the coat consists of an intimate mixture of black and white or bay and white hairs. The passage from one of these three tints to the others is a common and, be the cause what it may, an apparently simple phenomenon. It is for this reason that I regard the differences between the various kinds of Serows as of subspecific and not of specific importance, in spite of the fact that there is in most cases no actual proof of the existence of intermediates between the different forms that have been named*. For the present, at all events, therefore I agree with Mr. Lydekker in considering all the many described forms as belonging to a single species, which must take the name of the race that was first made known, namely the one from Sumatra which Bechstein described as *Antelope sumatraensis* †.

* It is the custom with some systematic zoologists to consider an insular form *ipso facto* as a species whatever grade of difference it presents from other insular forms or from the form from the adjacent mainland, on the grounds that the discontinuity in geographical distribution involves the non-existence of actual intermediate types. Were I to follow this course with respect to the Serows, I should be compelled to separate the Sumatran animal specifically from those from the mainland of Malacca, while uniting the latter specifically with those from Burma, China, and the Himalayas. Such a course, however, would, in my opinion, be a gross contravention of common sense, because it would give a higher systematic value to the comparatively trivial differences between the Sumatran and Southern Malayan animals than to the comparatively important differences between the Southern Malayan and Himalayan animals. In this and analogous cases it is surely a mistake to make geographical isolation the criterion of the value of a character. The character should be judged on its own merits and its importance determined by a study of the extent of the variation to which the particular species or allied species are liable.

† Pocock, Ann. Mag. Nat. Hist. (8) i. p. 187, 1908. For the discovery of this early name for the species I am indebted to Mr. C. D. Sherborn's invaluable 'Index Animalium.'

The genus *Capricornis* ranges through the Himalayas from Kashmir eastwards into Southern China and thence southwards through Burma and the Malay Peninsula into Sumatra.

CAPRICORNIS SUMATRAENSIS Bechst.

Antilope sumatraensis Bechstein, Uebersicht vierfüß. Thiere, i. p. 98, 1799 (based on the Cambing Outan, Marsden's Sumatra, ed. i, p. 93).

Antilope sumatrensis Shaw, Gen. Zool. ii. pt. 2, p. 354, 1801.

Nemorhedus sumatrensis H. Smith, Griffith's An. King. iv. p. 277, 1827; Jardine, Nat. Libr., Mamm. iv. p. 97, pl. ii., 1836.

Antilope interscapularis Lichtenstein, Berlin Mag. vi. p. 165, 1814.

Nec *Nemorhedus sumatrensis* Blanford, Fauna Brit. India, Mammalia, p. 514, 1891; Lydekker, Great and Small Game of India, p. 128, 1900; id. *op. cit.* nov. ed. p. 139, 1907; id. in Rowland Ward, Records of Big Game, p. 345, 1907.

The typical race of this species differs from all the known Himalayan forms in having the mane on the neck and withers hoary grey and contrasting forcibly with the dark coat of the rest of the body, and also in having no sharp line of demarcation in colour between the upper and lower portions of the legs, which are blackish below the knees and hocks, merely fading to dark brown upon the fetlocks. The conspicuousness of the mane obviously suggested the name *interscapularis* given to this animal by Lichtenstein.

It is to be noted that Dr. Blanford must have omitted to look up the original literature of this species, since he assigned the name *sumatrensis* to Serows from Moupin, Burma, the Malay Peninsula, and other localities which are quite different from the Sumatran form; and I have reason to think that, misled by him, Mr. Lydekker, in the works quoted above, described as typical *C. sumatrensis* the Darjiling Serow to which I have given below the subspecific name *janvrachi*.

It may be added that for many years there has been in the British Museum a subadult specimen of a Sumatran Serow agreeing in all essential respects with the examples figured and described by earlier authors as *Antilope* or *Nemorhedus sumatrensis* (*sumatrensis*). It was originally presented to the Zoological Society by Sir Stamford Raffles. Inspection of this specimen by later authors would have saved all the misconception as to the characters of this race which have been so frequently repeated in recent literature on the subject.

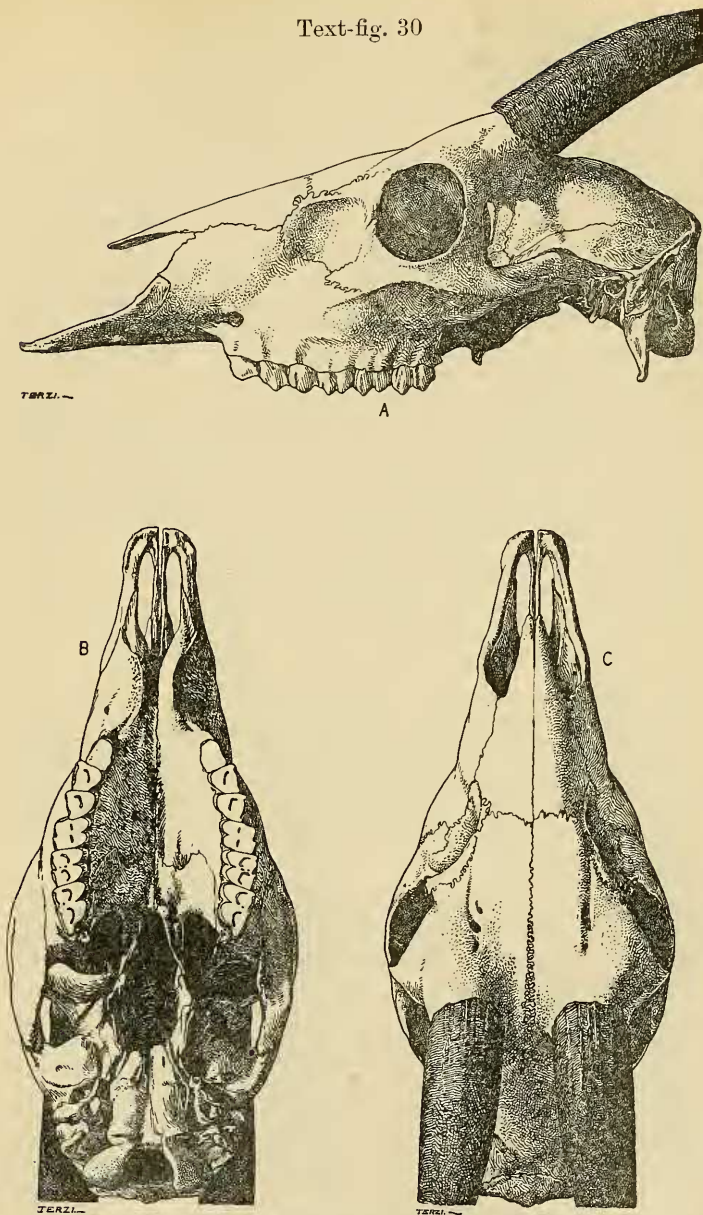
Subsp. *thar* Hodgson.

The Bubaline Antelope, Hodgson, Gleanings in Science, iii. p. 122, April 1831 (no scientific name).

Antilope thar Hodgson, Gleanings, iii. p. 324, Oct. 1831; id. P. Z. S. 1833, p. 105.

Antilope (Nemorhedus) thar Hodgson, P. Z. S. 1834, p. 86.

Text-fig. 30



Skull of *Capricornis sumatraensis thar* Hodgs., from Nepal.
(B.M. Reg. 55.12.26.143.) $\times \frac{1}{3}$.

A, from the side; B, from below; C, from above.

Capricornis thar Ogilby, P. Z. S. 1836, p. 138; Pocock, Ann. Mag. Nat. Hist. (8) i. p. 187, 1908.

Antilope bubalina Hodgson, P. Z. S. 1832, p. 12.

Nemorhædus or *Capricornis bubalinus* (in part) of most recent authors.

Hitherto only one kind of Serow has been distinguished in the Himalayan area. Of late years this has been invariably but erroneously cited as *Nemorhædus bubalinus*, after the example set by Blanford in his volume on the Mammalia of British India. Blanford, however, quite candidly pointed out that the oldest and therefore the correct specific (or subspecific) name for this animal was *thar*. Unfortunately this disregard for the rules of priority has been followed by authors who succeeded him. The early literature dealing with this Serow has been here repeated to emphasise the fact that *thar* is its proper name.

The only material of this race that I have been able to examine are four stuffed skins in the British Museum. Two of these belonged to Hodgson's collection and came from Nepal. They are the co-types or syntypes of the race; a third also came from Nepal; and a fourth, which appears to be inseparable from the others, was from Sikhim and belonged to Dr. Blanford, who mentioned it in his volume on Indian Mammals.

The characters of this race are briefly but, for my present purpose, sufficiently enumerated in the following pages.

Subsp. HUMEI Pocock.

Abstr. P. Z. S. No. 55, p. 12, March 17, 1908.

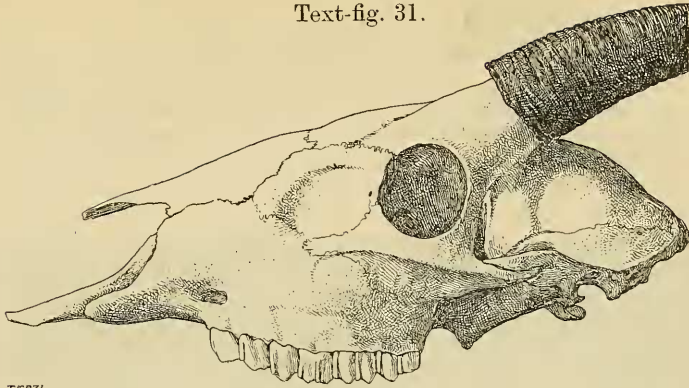
Distinguishable from the other geographical races of Serows occurring more to the east in the Himalayas by having the whole head a uniform pale chocolate-brown without any intermixture of black. Some black hairs amongst the brown on the anterior part of the neck. Anterior part of the lower jaw on each side white; no white throat-patch.

Loc. Kashmir.

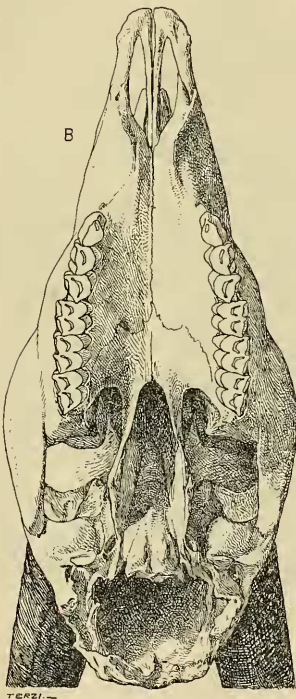
Type. The mounted head of an adult example in the British Museum formerly belonging to the collection of Mr. A. O. Hume.

Further evidence of the distinctness of the Kashmir form from the typical *C. s. thar* is supplied by the skull of a specimen, formerly belonging to Mr. R. Lydekker, from Pir Punjal in Kashmir. This skull differs in a number of particulars from two skulls of *C. s. thar* obtained by Hodgson in Nepal—particulars which combine to make the general "facies" of the skulls from the two localities very different. In the Kashmir skull the cheek-teeth are smaller, the palate wider, and the frontals and nasals more convex. The last-mentioned is the first distinctive feature that catches the eye upon a superficial glance at the skulls. There is, of course, no actual proof that the skull of the type of this race resembles the skull from Pir Punjal nor that the colouring of the Pir Punjal specimen resembled that of the type.

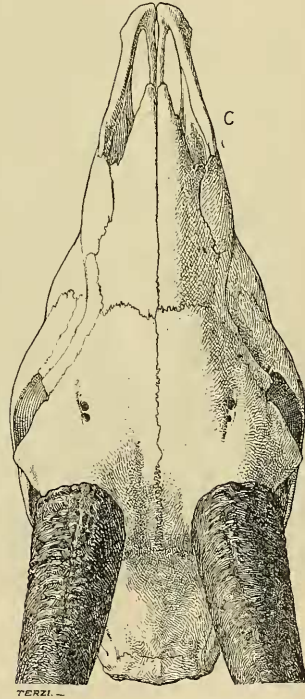
Text-fig. 31.



A



B



C

Skull of *Capricornis sumatraensis humei* Poc., from Pir Punjal in Kashmir.
(B.M. Reg. 88.3.20.16.) $\times \frac{1}{2}$.

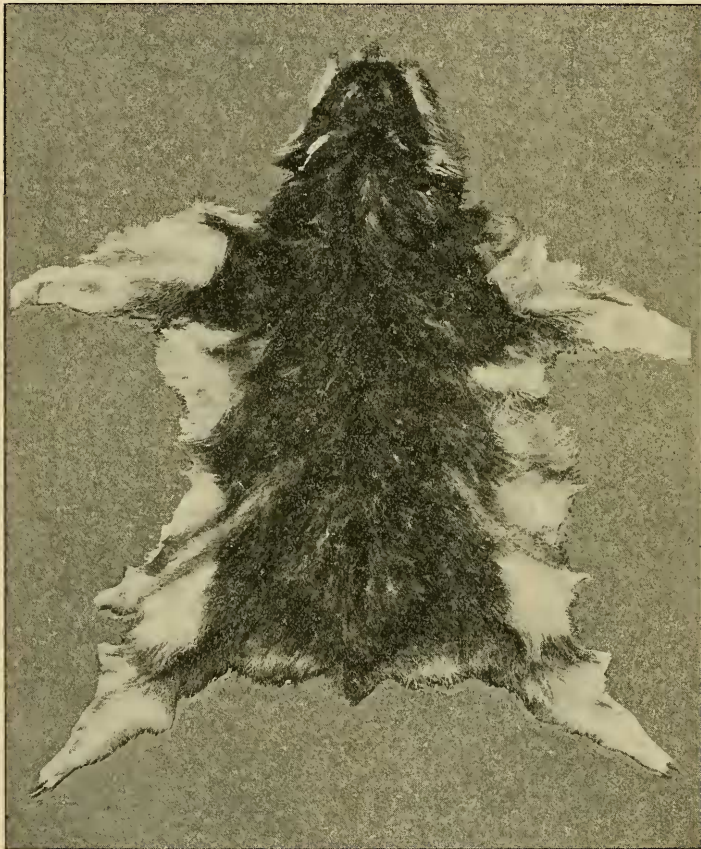
A, from the side; B, from below; C, from above.

Subsp. RODONI Pocock

Abstr. P. Z. S. No. 55, p. 12, March 17, 1908.

General colour of upper parts of head and body not jet-black but brownish black, due to the presence of a decided rufous tinge in the black terminal portion of the hairs. This rufous tinge is

Text-fig. 32.



Flat skin of *Capricornis sumatraensis rodoui* Poc., from Chamba. Type.

observable even in the hairs forming the mane on the middle line of the neck and along the spine. The forehead and the summit of the muzzle are nearly black, but the rufous colour persists as a narrow ring on most if not all the hairs. On the sides of the

head below the eye the rufous speckling is much more in evidence, and it is particularly well marked on the corners of the upper lip and at the base of the ear in front and up the back of that organ. Upper lip, lower lip, and chin white; the white from the chin extending backwards along the jaw and over the interramal area to the upper part of the throat, where it expands into a conspicuous patch. In the centre of the interramal area, behind the chin, there is a distinct elongated patch of dusky-brown hair, and behind this patch the hairs of the interramal area and of the throat-patch are not wholly white but apically infuscate. On the shoulders and on the sides of the body the rufous area in the hairs gradually increases in extent, so that the general colour above the white of the belly is markedly browner than that of the back. The outer side of the fore leg is rufous brown, intermixed with white in front, down to a point two inches above the knee, and the outer side of the hind leg down from the root of the tail nearly to the hock is also rufous brown, becoming mixed with white inferiorly. The chest, including the whorls of hair, the belly, the insides of the thighs and of the upper part of the fore legs, and the whole of the legs from above the knees and hocks are milk-white, and sharply defined by their colour from the adjacent rufous-brown areas. Only on the chest is the white clouded with a faint brown tinge. The tail, which is triangular and 2 inches long, is brownish black above, like the back.

The coat is long and shaggy, with a long and copious mane on the neck. The hairs on the sides of the body measure about 3 inches, and on the dorsal line of the neck about 8 inches in length. The underfur is plentiful.

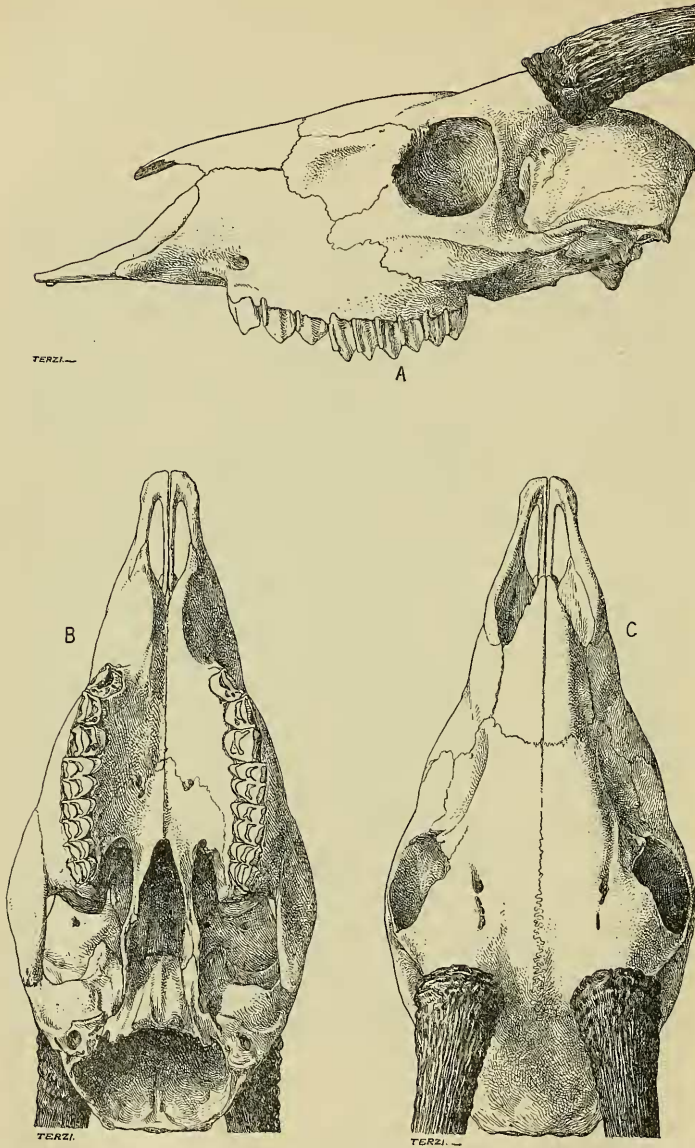
The horns are 8 inches long and $4\frac{3}{4}$ inches in basal circumference.

Total length of skin from tip of nose to root of tail 52 inches, distance from middle line of shoulder to hoof 34. Tail (skin) $1\frac{1}{2}$ inches.

Loc. Chamba.

This Serow differs from examples received from Hodgson from Nepal, and referable to typical *C. s. thar*, both in coloration and the structure of the skull. In the matter of coloration the difference lies principally in the clean whiteness of the whole of the under side, and its sharp definition from the rufous-brown or rufous hue of the sides of the body, and also in the backward extension of the white of the interramal area on to the throat, where it forms a conspicuous white patch. In *C. s. thar* the patch on the throat is absent or represented by a few white hairs, and these are not continuous with the white running along the anterior portion of the lower jaw behind the chin. The under side is not clean white, but dusky brownish grey, the hairs being whitish at the base and sooty grey distally, and the colour of the sides of the body gradually blends with that of the belly and chest. *C. s. thar* is also apparently a shorter and thinner coated form, and the underfur if present at all is scanty. Blanford, indeed (*op. cit.* p. 513), says "no underfur."

Text-fig. 33.



Skull of *Capricornis sumatraensis rodoni* Poc., from Chamba, belonging to the skin shown in text-fig. 32. $\times \frac{1}{3}$.

A, from the side; B, from below; C, from above.

The skull also presents some differences from the skull of a specimen sent by Hodgson from Nepal (text-fig. 30). In the latter, which measures 241 mm. in length from the occipital suture to the premaxillæ, the series of upper cheek-teeth measures 87 mm., the last molar being 20 mm. long and 16 wide; the width of the palate between the last molars is 52 and between the first premolars 38. Whereas in the skull of the specimen from Chamba, which measures, as above, 223 mm., the upper cheek-teeth are 93, the last molar 20×12 , and the two palatal breadths are 57 and 38. Thus in the specimen from Chamba the tooth-series is longer, the last molar much narrower as compared with its length, and the palate posteriorly broader. The skull is also higher and has the facial pit less deep. Be it noted, however, that it belonged to a younger animal.

The type of *C. s. rodoni* is the above described specimen, which is now in the British Museum.

Subsp. JAMRACHI Pocock.

Abstr. P. Z. S. No. 55, p. 12, March 17, 1908.

General colour of head and body coal-black, the hairs being white at the base and black distally, without any rufous-brown tinge in the black terminal portion. On the upper lip behind the white anterior portion there is a patch of brown, and hairs of a similar brownish-yellow colour surround the base of the ear and extend up the back of that organ. The white patch on the chin extends back on each side of the jaw halfway towards its angle, but there is scarcely any white hair on the throat. The chest also is blackish, and the hairs forming the whorls on the front of the chest near the base of the legs are black, with red basal portion. The belly is a dirty grey-brown. The shoulders are black, but on the fore leg between the elbow and knee, the hairs are a mixture of black and rufous brown, both on the outside and the inside of the limb. The knee itself is white like the fetlocks and pasterns, but the area between the fetlock and the knee (the cannon-bone) is strongly tinged with fawn or rusty yellow. Along a line running from the tail to the stifle, the black of the hind-quarters passes into the rusty-brown colour which pervades the outside and inside of the hind legs. Inferiorly this rusty brown pales to yellowish brown, the fetlocks being white. Except on the fetlocks, knees, inside of ears, upper lip, and chin, there is no white on the animal.

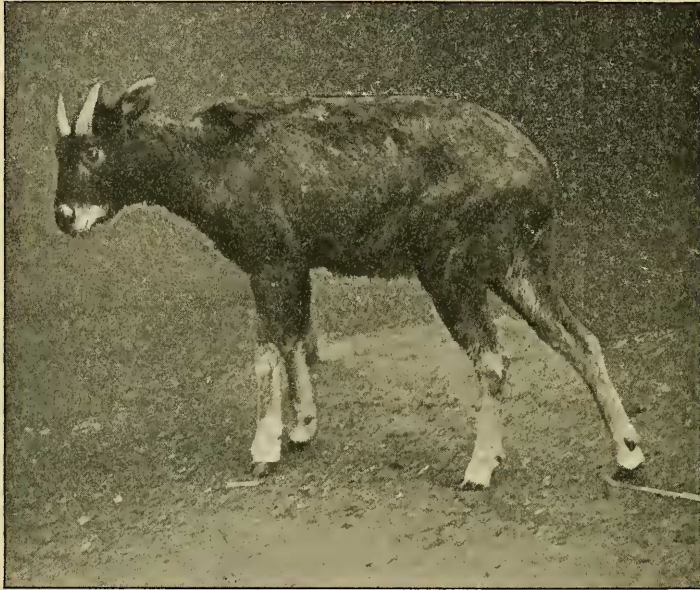
The coat is short at all seasons of the year, and not shaggy, and there is practically no underfur.

Loc. Kalimpong, near Darjiling.

A young female specimen of this Serow was purchased by the Society from Mr. W. Jamrach in August 1906. It was then, I should judge, about six months old, and it is important to record that up to the present time (that is to say, during the sixteen months that the animal has been under observation) she has not

changed at all in the matter of colour. She stands about 3 feet high at the withers, but from the size of her horns which measure 6 inches long, with a basal circumference of $4\frac{1}{2}$ inches, I judge her to be not yet fully adult.

Text-fig. 34.



Capricornis sumatraensis jamrachi Poc.

Photograph of specimen from Kalimpong, now living in the Society's Gardens.

In the Mammal Gallery of the Natural History Museum there is a mounted male specimen of this same race of Serow, which was presented by the Duke of Bedford, and is labelled *Nemorhaedus sumatrensis*. According to Blanford's 'Mammals of British India,' this determination is correct; but the animal is obviously quite different from the typical *Capricornis sumatraensis* of Bechstein, which has a grey mat-like mane on the withers and much darker lower legs. From information kindly supplied to me by the Duke of Bedford and Mr. Jamrach, I have been able to ascertain that this animal also came from Kalimpong. Except that there is a noticeable quantity of rusty yellow in the hairs of the forehead, this specimen does not appear to differ in any important particular from the female now living in the Gardens. As in the latter, the horns are rather small, measuring 156 mm. ($=6\frac{1}{4}$ inches) long, with a basal circumference of

100 mm. (=4 inches). Conceivably the smallness of the horns is a racial character; but I am more inclined to attribute it to immaturity.

The type of *C. s. jamrachi* is the mounted specimen above referred to in the Mammal Gallery of the British Museum (Reg. No. 2.10.12.1).

Of all the extra-Himalayan Serows recorded up to the present time, this subspecies is most nearly allied to *C. s. milne-edwardsii* David*, from Eastern Tibet. The colour of the body in the latter, however, is not so black as in *C. s. jamrachi*, and the tint of the legs is much more ferruginous. The darkening of the legs is carried still further in *C. s. argyrochaetes* Heude†, from Sze-chuen and Tché-kiang, for the anterior side of the cannon-bone is blackish. The mane, moreover, is grey. In the coloration of the legs *C. s. argyrochaetes* lies midway between *C. s. jamrachi* and the typical *C. s. sumatraensis*, while in the greyness of the mane it resembles the latter race. Of *C. s. argyrochaetes* the British Museum possesses two specimens, one a flat skin from Sze-chuen, obtained from Berezowski in 1896, the other a mounted specimen said to have come from Tibet, which Mr. Lydekker has recently described and figured (P. Z. S. 1905, p. 329, pl. viii.).

Subsp. ROBINSONI Pocock.

Abstr. P. Z. S. No. 55, p. 12, March 17, 1908.

Prevailing colour black, the hairs white at the root, usually brownish mesially and jet-black in their distal two-thirds. Head black, with a narrow grey rim to the upper lip and corner of the mouth, this grey continuous with a large patch of the same colour tinged in places with brown, which extends backwards to a point on a level with the orifice of the facial gland; chin black. Mane formed of a nearly equal mixture of white and black hairs, without any red; its anterior end, forming the occipital tuft, black with small white tips. The mane does not form a white mat-like patch on the withers. It is continued down the spine as a black crest. On the throat there is a small patch formed by the rufous or white tips to the hairs. On the tail and the outer side of the thighs there is a noticeable quantity of reddish-brown hair, and hairs of a similar hue surround the anus and extend along the edge of the under side of the tail, the upper side of which is black. Lower surface a dirty dark brown; inner side of thighs at base scantily clothed with dirty white hair. Fore and hind legs black, with dark chocolate-brown knees, hocks, and fetlocks.

Measurements in English inches of freshly stripped skin:—

Total length from nose-tip to tail-tip 60, tail 7 (with hair 10).
Height at withers 36, hock to heel $13\frac{1}{2}$, knee to heel $10\frac{1}{2}$, distance

* Nouv. Arch. Mus. v. Bull. p. 10, 1869. Also A. Milne-Edwards, Rech. Mamm. p. 365, pls. lxxii. & lxxiii., 1874.

† Hist. Nat. Chinois, ii. p. 4, 1888, and p. 228, 1894.

from anterior edge of eye to posterior edge of nostril $7\frac{1}{2}$; ear (along back) 8, inside space $6\frac{1}{2}$, width 3.

Loc. Selangor, in the Malay Peninsula.

The type of this species is a male specimen kindly presented to the Zoological Society by the Government of Selangor.

The skin and skull are now in the British Museum (Reg. No. 6.11.14.1).

Text-fig. 35.



Capricornis sumatraensis robinsoni Poc.

Photograph of specimen, from Selangor, that formerly lived in the Society's Gardens.

This Serow closely resembles the typical Sumatran form of the species, *C. s. sumatraensis*, in the black colouring of the lower half of the legs. So far, indeed, as I can judge, it differs from the latter only in having the mane less grey and less copious and thick on the withers. As might be expected from its distribution, it is almost intermediate between the Sumatran race and the one from the Larut Hills in Perak, *C. s. swettenhami* Butler*. Of the latter I have only seen one flat skin, ticketed Biserat

* P.Z.S. 1900, p. 675. Mr. Butler, misled by Blanford, separated this form from *C. s. sumatraensis* because of the blackness of the lower legs, which Blanford erroneously described as rufous in *C. s. sumatraensis*. See also S. S. Flower, P.Z.S. 1900, p. 371.

in the Malay Peninsula. This is in the British Museum (Reg. No. 3.2.6.77). Butler records the animal from the Larut Hills in Perak. In the Biserat skin the occipital crest is composed of hair principally white with black or red extremities; the rest of the mane consists of a mixture of red, black, and white hair, the red being much in evidence; also the pale patch on the anterior portion of the lower jaw is mostly red. It is on account of the almost complete absence of red from the mane and the small amount on the jaw of the Selangor specimen that I regard it as representing a geographical race of Serow, distinct from *C. s. swettenhami*.

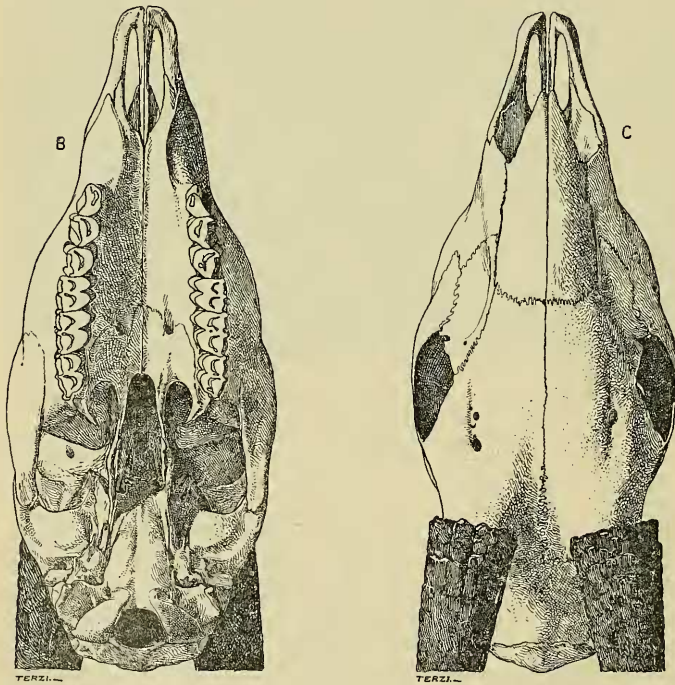
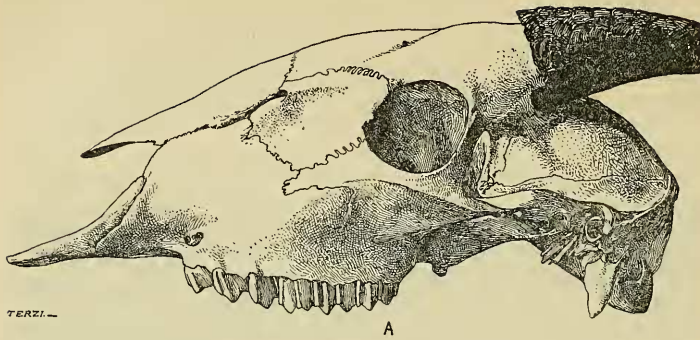
It is important here to repeat Mr. Butler's statement that a dead specimen seen by Mr. L. Wray, a living specimen seen by himself in the jungle, and a stuffed young one together with the type in the Perak Museum are alike, to all intents and purposes, in colour. Including, therefore, the example from Biserat in the British Museum, no fewer than five skins have been examined and reported upon. This is sufficient to justify the conclusion as to the constancy of the characters upon which *C. s. swettenhami* was based and to warrant the view that the Selangor form described above must be regarded as distinct.

I learn from Mr. H. C. Robinson, F.Z.S., the Curator of the Selangor State Museum, that this Serow was surprised in a patch of scrub near Batu on the coast of Selangor, and driven by dogs into the sea, where it was captured. There are no hills of more than two or three hundred feet in height for many miles from the spot where it was first discovered, the district towards the coast being mostly swampy land. The Serow must have wandered either from the range of hills between Negri Sembilan and Selangor, which jut off from the main backbone of the Peninsula of Malacca, or possibly from the latter range itself.

The animal was kept alive by natives for three months before it was shipped for London. It arrived in a very emaciated condition and died after a few weeks from starvation, caused by the blocking of the pylorus with masses of thickly felted soft woolly hair. That this was not derived from the animal itself is rendered probable by the absence of all underfur to the coat. It seems possible, therefore, that the animal devoured a blanket, or a piece of woollen cloth, during the time of his captivity with the natives.

The skulls of the typical *C. s. sumatraensis* and of *C. s. swettenhami* are unknown to me; but that of *C. s. robinsoni* differs in certain well-marked features from the skulls of all the Himalayan and Burmese specimens that I have been able to examine in the British Museum. It is long, narrow, and high, the frontals being unusually elevated and convex both antero-posteriorly and transversely between the orbits, so that the plane of the horns lies in almost the same line as the plane of the face, and the downward slope of the cranium posteriorly is somewhat abrupt. The facial or lacrymal fossa is shallow. The nasals also are

Text-fig. 36.



Skull of *Capricornis sumatraensis robinsoni* Poc., belonging to the specimen shown in text-fig. 35. (B.M. Reg. 6.11.4.1.)

A, from the side; B, from below; C, from above.

transversely convex and long. Regarding the skull from its ventral aspect, it is evident that the basi-facial axis is more bent upon the basi-cranial axis than in other specimens. The horns are short and thick, the sheath measuring only 160 mm. ($6\frac{1}{2}$ inches) with a basal circumference of 125 mm. (5 inches).

Subjoined is a table of measurements of four skulls of Serows from Kashmir, Nepal, Chamba, and Selangor.

Skull-measurements in millimetres.*

	<i>Kashmir.</i>	<i>Nepal.</i>	<i>Chamba.</i>	<i>Selangor.</i>
† Basal length from occipital suture to distal end of premaxillæ ...	245	241	223	210
Width across zygomata	130	128	127	117
" " maxillæ	98	98	98	102
" " between orbits	93	87	78	81
Median length of frontal	112	105	112	118
" " nasal	94	93	73	103
Width across nasals	50	47	41	48
Width across premaxillæ (maximum).....	53	51	50	54
Width across premaxillæ (distal end)	32	31	26	27
Height from alveolus of molar 2 to summit of frontals	104	94	98	114
Height from alveolus of premolar 3 to summit of nasals.....	94	84	90	103
Length of cheek-teeth	90	87	93	92
Length and width of last molar ...	20, 13	20, 16	20, 12	21, 13
Median length of palate to distal end of premaxillæ	162	167	148	161
Width of palate between last molars	60	52	57	50
Width of palate between first premolars	41	38	38	38

In spite, however, of the differences above set forth, I think it premature to attach very much weight to them and to draw conclusions as to their constancy until the extent of the variations of the skull with age, possibly with sex, and in a number of individuals from the same locality, has been ascertained. These remarks apply more particularly to the specimens from the Himalayas, of which the dimensions are tabulated above. The explanation of the differences, for example, between the Kashmir and Nepal skulls may be a matter of age if the skull becomes flatter, narrower in the palate, and deeper in the preorbital pit with advance of years ‡. It is significant that one of the skulls

* Measurements taken with a compass or dividers.

† This measurement is taken from the basioccipital suture instead of from the occipital foramen, because the occipital region of the skull is not infrequently absent in prepared skulls.

‡ Implicit faith in the systematic value of cranial and dental differences, coupled with inexperience in osteology and injudicious handling of material, seems to have been responsible for the vast numbers of "species" into which the Deer, Pigs, and Antelopes, including Serows and Gorals, of Southern China have been split by Père Heude.

brought by Hodgson from Nepal is intermediate, or nearly so, between two others from that country and the one from Kashmir. The skull from Selangor, however, can be at once singled out from the others by its general aspect and dimensions.

The seven geographical races of Serow (*Capricornis sumatraensis*) discussed above may be distinguished externally as follows :—

- | | |
|--|----------------------|
| a. Legs below the knees and hocks white, whitish, or fawn and lighter than the area above these joints* | |
| b. Head pale chocolate-brown, not appreciably intermixed with black | <i>humei.</i> |
| b'. Head black or brownish black. | |
| c. Breast and under side white, and sharply defined from the dark colour of the rest of the body, which is covered with a thick coating of long black hair tinged with red; underfur conspicuous; a distinct and large white patch on the throat | <i>rodoni.</i> |
| c'. Breast and under side at most dirty white and blending with the dark colour of the rest of the body, the hair of which is scantier and darker with little if any underfur; at most a small patch on the throat. | |
| d. Under side dirty white or rufous white; the coat less black; lower portion of legs white or faintly tinged with fawn | <i>thar.</i> |
| d'. Under side blackish red; the coat jet-black; lower portion of legs very decidedly tinged with fawn on the cannon-bone | <i>jamrachi.</i> |
| a'. Legs below the knees and hocks black, not lighter than area above these joints† | |
| e. Scarcely any red in the mane and on the white patch on the under jaw. | |
| f. Mane for the most part hoary grey and forming a large thick mat on the withers | <i>sumatraensis.</i> |
| f'. Mane less grey and not forming a large mat on the withers | <i>robinsoni.</i> |
| e'. A considerable quantity of red in the mane and on the patch on the under jaw | <i>swettenhami.</i> |

III. On the *Gorals* (*Nemorhedus*) of the *Himalayas*, *Burma*, and *China*.

Up to the end of 1904 only one species of Goral was known from the Himalayas; but in the 'Zoologist' for March 1905, pp. 81-84, Mr. Lydekker correctly pointed out that two types of Goral occur in those mountains, one in the western and the other in the more eastern portions of the range, the two meeting in Nepal. To the eastern form, termed the "brown" Goral, the specific name *goral* was restricted; while the western form, termed the "grey" Goral, was described as a new species under the name

* Not known for certain in the case of *C. s. humei*.

† Some Chinese Serows are intermediate in the coloration of the legs between *C. s. jamrachi* and *C. s. sumatraensis*. For instance, *C. s. milne-edwardsi* from Eastern Tibet has the lower legs rusty yellow, and an example in the British Museum from Sze-chuen (Berezowski), referable to *C. s. argyrochaetes*, has the cannon-bone blackish in front and rufous elsewhere.

bedfordi. Apart from the noticeable difference in colour between the two, the "brown" Goral is further distinguished by the presence of a black spinal stripe which is absent, at least on the back and tail, in the "grey" form.

Now, *Antilope goral* was first described by Hardwicke (Tr. Linn. Soc. xiv. p. 518, 1825). The description, taken from a living animal, states that the hair was of a "grey mouse-colour (but almost white about the lower part of the neck and throat), and darker; it is longer along the upper part of the neck and back, inclining to ferruginous about the legs." Similarly the Latin diagnosis says: "Corpore supra colore murino canescente, subtus pallidioro, gula albente."

It is, in my opinion, impossible to maintain that Hardwicke can have described as "grey mouse-coloured" an animal which is *not* grey, and which was regarded independently by Hodgson as "rusty and brown"; by Dr. Blanford as "brown, more or less rufous"*; and by Mr. Lydekker as "rufous brown." Hardwicke's use of the terms "grey" and "canescent" as applied to the body and the contrast that he draws between that colour and the inclination to a ferruginous tint on the legs make unavoidable the conclusion that the specimens upon which the specific name *goral* was based represented a form identical with or very closely allied to the one that Mr. Lydekker spoke of as the "grey" Goral and named *Urotragus bedfordi*.

It must be particularly borne in mind, too, that although Hardwicke noticed the length of the hair on the upper part of the neck and back in the type of his species, he made no mention of the presence of the black spinal stripe so conspicuous in adults of the "brown" Goral. The figure, it is true, shows such a stripe on the neck and withers; but this is sometimes present in specimens of the "grey" Goral, and is very noticeable in the living example of the latter now in the Zoological Gardens when the neck-hairs are parted.

The description of *N. goral* was taken from a male specimen living in the menagerie at Barrackpore, near Calcutta, which had been previously the property of the Court at Katmandu in Nepal; and there is a skin of a "grey" specimen in the British Museum, ticketed Nepal (Maharajah Dhuleep Singh; 55.1.20.5), which Mr. Lydekker identified as *N. bedfordi*.

For the type of *N. bedfordi*, a mounted specimen now in the British Museum (Reg. no. 97.4.3.1) and at one time the property of the Duke of Bedford, no locality was known. The specimen, however, as His Grace has kindly informed me, was imported by Mr. William Jamrach; and I learn from Mr. Jamrach that he formerly procured Gorals from Dharmasala. This circumstance and the similarity between the specimen named *N. bedfordi* and a series of skins of Gorals from Chamba, shot by H.H. the Rajah

* This author adds "or greyish." Be it remembered, however, that he had access to the material in the British Museum containing a specimen of the "grey" Goral, which he apparently did not distinguish from the "brown" form.

of Chamba and kindly sent to me through Major Rodon, F.Z.S., point to Dharmsala as the locality of the typical example of *N. bedfordi*. This specimen Mr. Lydekker described as yellowish grey-fawn, suffused with blackish, which can be interpreted as merely another way of describing the colour which conveyed to Hardwicke the impression of "mouse-grey and darker."

But, as one of the features distinctive of *N. bedfordi*, Mr. Lydekker mentioned the large extension of the white of the interramal area up the cheek. This exists undeniably in the stuffed specimen; but one's confidence in the systematic value of the character is completely shattered by the entire absence of any indication of it in the excellent photograph of the living animal, taken by the Duchess of Bedford, which Mr. Lydekker has published*. No one who looks at this photograph can for one moment believe that the lower part of the cheek up to or even above the level of the corner of the mouth was white or different in tint from the rest of the cheek. The upward extension, therefore, of the white in the stuffed specimen must be merely due to a taxidermic distortion, unless the colour of this region changed between the time of taking the photograph and the death of the animal, which is unlikely.

In view of the above-mentioned facts, the following conclusions appear to me to be inevitable:—(1) That the type of *N. goral* was the "grey" Himalayan form; (2) that Mr. Lydekker re-described this form as *N. bedfordi*. And from this it follows that the "brown" Himalayan Goral is up to the present time without a specific name. From the nature of the differences separating the "grey" and "brown" Gorals I think it probable that they will be found to intergrade. Up to the present, however, there is, so far as I am aware, no proof of the fact. Since the two forms have been recorded from Nepal it is possible, as Mr. Lydekker has suggested, that they occur at different altitudes in the Himalayas. Pending additions to our knowledge in these particulars, I propose to follow Mr. Lydekker in treating these Gorals as distinct species.

NEMORHEDUS GORAL Hardwicke.

Antelope goral Hardwicke, Tr. Linn. Soc., Zool. xiv. p. 518, pl. xiv., 1825.

Urotragus bedfordi Lydekker, Zoologist, March 16th, 1905, p. 83; id. Great and Small Game of India, nov. ed. p. 151, 1907; id. in Rowland Ward's Records of Big Game, p. 343, fig. p. 348, 1907.

Prevailing colour yellowish grey, speckled or suffused to a varying extent with black, so that the depth of the tint varies considerably individually, but the pale band in the hairs is always yellowish grey and never rufous or brown. Forehead suffused with rusty yellow, the same tint traceable on the sides of the

* 'Zoologist,' 1905, pl. i.; 'Great and Small Game of India,' p. 137, 1900; nov. ed. 1907, p. 149; Rowland Ward's 'Records of Big Game,' 1907, p. 348.

nose; cheeks grey, interramal area and chin white; upper lip white, stained with yellow at the sides. Throat-patch yellowish or snow-white, sometimes set off by a darker border; ears mouse-grey or yellowish externally. Between the horns a tuft of dark or black hair intermixed with white; usually there is no black spinal stripe either on the neck or body, but the hairs on the middle line of the neck show up as distinctly darker than the sides, owing to their partially erect position revealing the slate-grey colour of the basal portion. In one specimen, however, the

Text-fig. 37.

*Nemorhedus goral* Hardw.

Photograph of specimen from Chamba, now living in the Society's Gardens.

hairs on the middle line of the neck and withers have long black tips, which run together to form a distinct blackish line. Tail the same colour as the back in its basal half*, but the tip with a longish tuft of hairs black throughout. Skin of tail white below. Subcaudal area fringed with white hairs. No blackish stripe extending up the buttocks from the legs. Colour of legs very variable; fore legs usually with a well-defined black stripe

* In Mr. Lydekker's description of *N. bedfordi* the "base" of the tail, instead of the "tip," is described as blackish.

extending down the middle from above the knee to the fetlock ; but in one skin from Chamba and in the type of *N. bedfordi* the stripe is quite short and inconspicuous, except upon the knee ; the sides and posterior surface of the leg below the knee varying from a rich fawn to greyish, sometimes even whitish on the inner side. Hind legs similarly variable, darker or lighter fawn down the front, sometimes showing some black hairs above the fetlock and sometimes whitish on the inside ; the posterior surface from the hock always darker than the anterior, never fawn, and usually blackish. Belly and inside of thighs white or greyish, sometimes with a yellow tinge ; a dark patch on the chest.

Loc. Chamba ; ? Dharmsala and Nepal.

The above-given description is taken from a single example from Chamba now living in the Gardens, which was presented to the Society by Major Rodon, F.Z.S., on June 3, 1904, and also from a series of eight skins of specimens shot in Chamba by H.H. the Maharajah, who kindly gave them to Major Rodon to forward to me for examination and description. This series has been especially useful in showing the variation in detail, and at the same time the constancy in general appearance presented by a number of individuals from the same locality. From these Chamba skins the type of *N. bedfordi*, which probably came from Dharmsala, and the above-mentioned skin in the British Museum ticketed Nepal (Maharajah Dhuleep Singh), are not, in my opinion, separable by a single character of systematic value.

It is interesting to record that the example of this race now living in the Gardens was a quite young animal on its arrival in June 1904, and that, except for increase in size of body and length of horn, it has not appreciably altered in appearance. Nor is there any marked seasonal variation in colour, the new summer coat being merely a little richer in tint than the old coat before shedding begins.

On one occasion about a year ago this animal got into a yard where there was a well-grown specimen of a Grecian Ibex, considerably larger and more heavily built than the Goral. But, in spite of the confined space, I am quite sure that the fight that ensued would have ended fatally for the Ibex, which, although full of pluck and eagerness for the fray, seemed bewildered by the agility of his antagonist. The Goral's method of fighting was to charge low under the guard of the Ibex's heavy recurved horns, then to get out of reach, never giving the Ibex a chance of one straightforward butt, which would probably have ended the contest in his favour. Before the combatants could be separated the Goral had succeeded in wounding the Ibex in the nose with his short sharp horns. The efficacy of the short pointed horn as compared with the heavy horn in Goat-like ruminants was further exemplified some years ago by another fight that took place, I have been told by Mr. Thomson, between a male Thar (*Hemitragus jemlaicus*) and a Markhoor (*Capra falconeri*). In less than five minutes the Thar killed the Markhoor by getting past his

horns and ripping open his abdomen. But in this particular instance I have no first-hand knowledge of equality between the contestants in the matter of age and condition, as I have in the case of the Goral and the Ibex.

NEMORHEDUS HODGSONI Pocock.

Abstr. P. Z. S. No. 55, p. 12, March 17, 1908.

Nemorhedus (Antilope) goral Hodgson, P. Z. S. 1834, p. 85.

Cemas goral Blanford, Fauna of Brit. Ind., Mammalia, p. 516, 1891.

Urotragus goral Lydekker, Zoologist, March 16th, 1905, p. 83; id. Great and Small Game of India, nov. ed. p. 151, 1907; id. in Rowland Ward's Records of Big Game, p. 342, 1907.

Nec *Antilope goral* Hardwicke, Tr. Linn. Soc., Zool. xiv. p. 518, 1825.

General colour of type darkish golden brown speckled with black, the individual hairs dark brown at the base, black at the apex, and with an intermediate golden-brown or rufous area. Forehead and nose deep reddish brown, becoming blacker towards the root of the horns, a small black patch above the muzzle; cheeks yellowish brown, paler than body owing to the absence of the black apical tip to the hairs; interramal area not white but stained with yellow, a brown patch on the chin; lips yellowish white; throat-patch yellowish white, defined laterally by an indistinct blackish streak.

A black stripe extending from the head along the neck, where the hairs form a short mane, down the back to the root of the tail. On the neck it is about 1 inch broad, but behind the shoulder it gradually tapers away and almost disappears upon the lumbar and sacral regions. A black patch on the chest; belly greyish yellow. Tail wholly black above, except for a few pale hairs at the side. Area below the tail white above in the adanal region, yellowish below on the inside of the thighs. From near the root of the tail on each side extends a blackish-brown stripe down the back of the thigh and leg to the hock, and this is continued from the hock to the fetlock and beneath the "dew-claws" to the hoof; front of hind legs below the hock golden brown, with commonly a blackish stripe. Fore legs golden brown, with a black patch over the knee and black hairs extending in the middle line thence both below and above the knee, where the hairs are a bright, almost fiery, brown. Horns but little curved, $4\frac{1}{2}$ inches long, corrugated and ringed basally, basal antero-posterior width $\frac{7}{8}$ of an inch (23 mm.). Ear-cavity about $3\frac{1}{2}$ inches long.

Loc. (of type). Sikhim (*W. T. Blanford*; no. 91.10.7.169 in B.M.); also Nepal (*B. H. Hodgson*).

In addition to the typical skin above described, there are in the British Museum three other skins referable, I think, to this race of Goral. They are ticketed Nepal (*B. H. Hodgson*; nos. 45.1.8.325-327). In the largest of these the general colour is

browner, with the hair less noticeably speckled than in the type, and the throat-patch and interramal area are white, the latter being a dirtier white than the former. The horns are $3\frac{1}{2}$ inches long (90 mm.), with a basal diameter of $\frac{3}{4}$ of an inch (20 mm.). A second example is evidently young; the fur is softer and thicker and also less speckled than in the first, and the face is less richly coloured and somewhat greyer. The third specimen, a young and hornless individual, while presenting the same general type of coloration as the others, differs from them in that the black spinal stripe fades away on the lumbar region and the tail is not black above. Hodgson's remark that the young is redder than the adult and destitute of mantle and mane is worth repeating.

A young example of this species from Nepal was presented to the Society by the Prince of Wales in June 1906, but died a few days after arrival.

NEMORHEDUS RADDEANUS Heude.

Antelope (Caprina) crispa Radde, Reisen im Süden von Ost-Sibirien, i. pp. 262-270, pl. xii. fig. 1 (nec *Antelope crispa* Temm.).

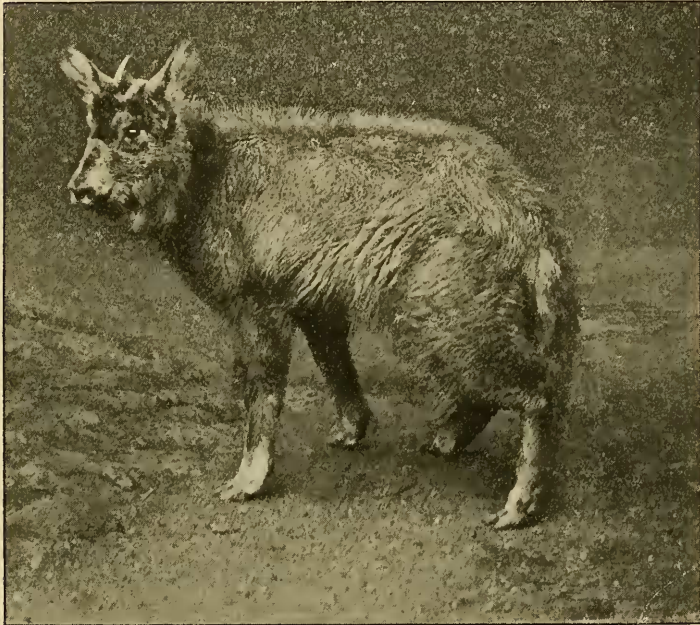
Kemas raddeanus Heude, Hist. Nat. Chinois, ii. p. 240, pl. 35, 1894.

General colour of the shaggy winter coat greyish yellow-brown, darker along the spinal area.

Upper surface of head blackish from the muzzle back to the occiput; sides of the head and of the lips greyish yellow mixed with black; rest of lips white; chin black. Throat with a large white gular patch. Ears white inside; pale mouse-grey, darker at the base, with brown edging externally. On the nape of the neck the hairs form a short blackish mane. On the lumbo-sacral area the dark spinal stripe is fainter than it is anteriorly. On the shoulder there is an ill-defined scapular stripe, which inferiorly turns into a jet-black stripe running down to the knee and thence over it externally nearly to the fetlock. On the inner side of the cannon-bone this is set off by a yellowish-grey stripe, which is continuous inferiorly with the yellowish-grey hue involving the front and sides of the fetlock and pastern; the posterior surface of the leg is brown, turning to black on the back of the fetlock. The hind leg is chocolate-brown from the hock to the fetlock, brownish in front, and paler yellow-brown at the sides, the pastern being creamy yellow anteriorly and laterally, like that of the fore leg. The breast and anterior part of the belly are blackish, but the groin, the inside of the thighs, and the back of the thighs up to the root of the tail are white. The tail is brown above and white below; the extremity of the tail is furnished with a mixture of long black and white hairs which extend below the hocks. The skin of the tail on its under side is about $4\frac{1}{2}$ inches (112 mm.), and the total length of the organ to the tip of the hair is about 15 inches (375 mm.).

The length of the right horn, which is normal in position, is rather less than 5 inches (125 mm.). That of the left horn, which is bent sharply backwards in its distal half, so that the point is unworn, is $6\frac{1}{4}$ inches (156 mm.). The basal circumference is $3\frac{1}{4}$ inches (89 mm.).

Text-fig. 38.



Nemorhedus raddeanus Heude.

Photograph of specimen, from Korea, that formerly lived in the Society's Gardens.

The principal dimensions of the skull in mm. are as follows:—

Basal length	192
Length of palate along middle line	122
" cheek-teeth	70
Width of palate between pms ¹	21
" " " ms ³	39
Length from pm ¹ to tip of premaxilla	55
" of nasals	69
Width of nasals	32
Interorbital width	69
Greatest width across orbits	99
" " " maxillæ	67
" " of cranium	65

Loc. Korea: Wünsan (?).

A living specimen of this Goral was presented to the Society by Mr. C. F. Bilborough, F.R.G.S., on Feb. 5, 1907, and died on June 30, 1907. Mrs. Bilborough informed me that it "came from the high chain of mountains that runs down the whole length of Korea, rising at Wünsan to 12,000 feet high."

I cannot distinguish the skin of this Korean specimen specifically or even subspecifically from three Goral skins presented to the British Museum by Mr. Rowland Ward, F.Z.S., and ticketed "Western Provinces of China" (nos. 99.3.5.1-3 in B.M. Register); and, so far as I can judge, they are all referable to the species from Amurland, wrongly identified by Radde as *Antilope (Caprina) crisa* of Temminck, and rightly renamed *Kemas raddeanus* by Heude.

Nemorhedus raddeanus was regarded by Trouessart as a subspecies of *N. caudatus* M.-Edwards, presumably because of the length of the tail. In the British Museum there is a topotypical example of *N. caudatus* from Pekin, collected by Mr. F. W. Styan (Reg. no. 90.7.8.6). This specimen has the thick, long woolly coat observable in the above-mentioned examples referred to *N. raddeanus*, and the tail also is practically of the same length, as the following measurements show:—

	Skin of tail.	Tail (including hair).
<i>N. caudatus</i> (young).....	4 inches.	about 13 inches.
<i>N. raddeanus</i> (1 ♂).....	5 "	" 10 "
" (2 ♀).....	5½ "	" 13 "
" (3 yg.).....	4½ "	" 11 "
" (Korea).....	4½ "	" 15 "

Nevertheless, the example of *N. caudatus*, which agrees with M.-Edwards's description and figure of the type, differs from those identified as *N. raddeanus* in having the legs below the knees and hocks almost wholly fawn-coloured in front, the fetlocks and pasterns being the same tint as the cannon-bones, and also in having the tail much blacker, both above and below. Hence there are well-marked differences between *N. caudatus* and *N. raddeanus*. Intermediates possibly, perhaps probably, exist; but until they come to hand I think it premature to regard *N. raddeanus* as a subspecies of *N. caudatus*.

The specimens from the Western Province of China exhibit variation in colour worth putting on record. The male specimen (no. 99.3.5.1) closely resembles the Korean example, being dark grey mingled with blackish brown, the upper side of the tail being of the same dark hue as the back; the fore leg is black in front down to the knee, and the outer and posterior sides of the lower leg are also black, but the fetlock and anterior and inner side of this region are white, the area above the outer false hoof being black and above the inner white. Similarly the hind legs are blackish both in front and behind, the fetlocks and pasterns being whitish

with some black hairs towards the outer side. The female, on the contrary (no. 99.3.5.2), with the same history and presumably from the same locality, is much paler, the general colour being yellowish brown, the upper surface of the tail being the same yellowish-brown colour as the hind-quarters. On the fore leg the blackness scarcely extends below the knee, the blackness of the outer side of this area, so noticeable in the male, being scarcely in evidence. Similarly the hind legs are yellowish brown in front below the hocks. I do not know whether these differences are sexual, seasonal, or individual. The third specimen (no. 99.3.5.3), an immature unsexed animal, resembles the female.

So far as the coloration of the legs is concerned, the examples I refer to *N. raddeanus* are more like specimens in the British Museum from Southern China than they are like *N. caudatus*. These Southern Chinese specimens, which appear to me to be specifically the same as *N. griseus* A. M.-Edw.*, described from Eastern Tibet, were obtained by Berezowski at Loung-nyou-fou in the mountain of Sze-chuen (nos. 96.11.4.7-8) and by Mr. F. W. Styan at Ichang on the Yangtse-kiang (nos. 1.3.2.4 and 95.7.4.1-2). A young example was also brought from the same locality by Mr. P. Montgomery (no. 96.11.4.7-8).

Except that these southern forms are covered with a thick coating of comparatively short hair and have the hairs of the tail also shorter and scantier, they do not differ very noticeably from *N. raddeanus*. The skin of the tail measures from 4 to 5 inches, and, including the hair, the entire tail may reach 10 inches. The hairs of the tail, however, are black both above and below, and in this particular resemble those of *N. caudatus* rather than of *N. raddeanus*; and the white throat-patch is tinged with yellow at the margins. The outer and posterior sides of the lower portion of the front leg are blackish, the knee, the inner side of this area, and the feet being darker or paler fawn. The hind legs, below the hock, are brown behind, fawn or greyish fawn in front.

Like *N. raddeanus*, *N. griseus* exhibits instructive variation in colour. Of the three above-mentioned skins from Ichang no two are alike. In one male example shot on September 9 the coat is poor and of a dirty yellowish brown, with a very distinct black spinal stripe, and the feet are a warm ferruginous or rusty-yellow tint. A second specimen, shot on the same date and also a male, has no distinct spinal stripe, the coat being a mixture of brown and grey. The feet are nearly white. The third specimen, also a male but shot in December, is thicker-coated and much more richly coloured with dark brown than the others, though more approaching the second specimen; the spinal stripe is traceable but less differentiated than in the first specimen, owing to the darker tint of the rest of the body; the feet are fawn—that is to

* Nouv. Arch. Mus. vii. Bull. p. 93; Rech. Mamm. p. 361, pl. lxxi. 1874.

say, intermediate between the ferruginous tint of the first and the white tint of those of the second specimen. The edges of the throat-patch are also yellower than in the others. Since these specimens were of the same sex and from the same locality, and since the first and second were shot on the same day, it does not appear that these colour-differences are either sexual or seasonal. They are perhaps due in part to differences of age and in part to innate individual variability.

Berezowski's specimens from Sze-chuen are inseparable from the richest-coloured example from Ichang. They were shot in January. The coat is richly coloured brown and grey. In one the feet are fawn, in the other nearly white.

I cannot find any reliable character to distinguish these specimens from *N. griseus*, judging from the description and figure of the latter.

A further point to be noted is this. A Goral from Ichang was recorded by Dr. Henry as *Kemas henryanus* (P. Z. S. 1890, p. 93). This name was quoted as having been already published by Heude. But Heude's description of *Kemas henryanus* was not issued apparently until 1894, when it appeared in Mém. Soc. Hist. Nat. Chinois, ii. p. 244; and since Dr. Henry's citation was accompanied by the phrase "The Ichang animal stands as high as a Sheep," he must be regarded as the author*. Furthermore, Dr. Schlater (P. Z. S. 1890, p. 94, note) refers the Ichang example in the British Museum, collected by Mr. P. Montgomery, to *Nemorhedus henryanus*. This Ichang Goral may possibly prove to be subspecifically distinguishable from the typical *N. griseus* when topotypical examples of the latter come to hand for comparison; but for the present I think it must be referred to that form.

Finally, I am convinced that Mr. Lydekker described the same animal as *Urotragus evansi* ('Zoologist,' (4) ix. p. 83, 1905; id. in Rowland Ward's 'Records of Big Game,' p. 343, 1907). Of this there are two cotypical examples in the British Museum from Mt. Victoria in the Pokokku district of Arakan (*Major Evans*: 5.7.21.1-2). They are quite young animals with the horns measuring only 3 inches in length. They differ in no important particulars, so far as I can ascertain, from the Ichang and Sze-chuen specimens that I refer to *N. griseus*. Moreover, in the summer of 1903 Mrs. Mumford sent to me for identification the skins of three "Goats" shot by her late husband, Mr. G. E. Mumford, District Superintendent of the Burma Police, at Kyank-pin-daung in the Arakan Hills. When compared with the material in the British Museum, these skins proved to be indistinguishable from those from Sze-chuen and Ichang, mentioned above, which I could not separate from *N. griseus*. Hence, although no new name could be introduced, the real credit of being the first to send home material showing that the Arakan Goral is distinct from the Himalayan

* Trouessart erroneously cites *K. henryanus* as "*nomen nudum*."

animals belongs to Mr. Mumford rather than to Major Evans. Honours, however, are divided, because Major Evans's skins were perfect, whereas those belonging to Mrs. Mumford had been made into mats and were without heads and legs.

That Mr. Lydekker fell into the error of giving a new name to the Arakan Gorral must be attributed to his comparing it with Himalayan specimens and not with examples from South China. Identity between Burmese and Southern Chinese animals is in no sense a surprising fact.

The following synonymy, therefore, I believe to be well established:—

N. griseus M.-Edwards, 1874 = *N. henryanus* Henry, 1890 = *N. evansi* Lydekker, 1905.

If my supposition that the above-mentioned Gorals from Ichang, Sze-chuen, and Arakan belong to the same species is correct, it proves that this species, whatever its name, has a wide geographical range, and presents very considerable individual variation in specimens from the same locality with respect to the colour of the body and of the feet. Indeed, when the variability in these particulars exhibited by the three examples from Ichang is taken into consideration, grave doubts must be thrown upon the status of some of the many so-called species from Southern China described by Heude.

This author, for example, described two "species" from Western Sze-chuen, namely, *Kemas* [= *Nemorhedus*] *xantho-deiros* and *K. pinchonianus*, and one from Eastern Sze-chuen, namely, *K. iodinus**; but, judging from the descriptions, these differ less from each other in colour than do the three skins from Ichang. It is necessary to add that Heude relied in his specific determinations largely upon characters in the skull and teeth, many of which are, I suspect, attributable to differences of age and to individual variability †.

Finally, I suspect that *N. arnouxiianus* Heude ‡ from Tcheking must also be referred to the species I have determined above as *N. griseus*. So far as colour is concerned, no difference seems to exist between them, and the chief character in the skull Heude relied upon, namely the somewhat abrupt rise of the horns from the frontal bone, is also, I think, untrustworthy; for considerable variation in this respect is exhibited by the skulls of

* Mém. l'Hist. nat. Chinois, ii. p. 243, 1894.

† Of the type of one of his "species," *N. niger*, Heude says that the discoverer informed him "qu'elle était rare et qu'on la voyait mêlée aux troupeaux des autres espèces" (op. cit. p. 241). Heude's apparent acceptance of this statement in good faith, and his admission that the type of *N. niger* was in the same herd as examples of *N. fargesianus*, make it impossible to accept the author's opinion as to specific differences. Two distinct species of a genus of Antelopes and Sheep sometimes run together; but such cases are quite exceptional, and in the present instance it appears to me that the evidence points to the type of *N. niger* being an aged individual of a species of which the co-types of *N. fargesianus* were younger forms.

‡ Mém. l'Hist. nat. Chinois, ii. p. 3, 1888, and *tom. cit.* p. 239, 1894; *op. cit.* iii. pl. xxix., 1897.

three specimens from Ichang in the British Museum. In one specimen, a young one collected by Mr. Styan, the horns lie back practically in the same line as the forehead; in a second obtained by the same collector they rise slightly more; and in a third sent by Mr. P. Montgomery they are still more elevated, forming an obtuse angle with the frontal bone very much as in the type of *N. arnouxianus*.

The external characters of the Gorals (*Nemorhedus*), whether they be regarded as species or subspecies, discussed in the preceding pages, may be analysed as follows:—

- a.* Skin of tail about 3 inches long in the adult; black stripe on fore leg extending over the middle of the knee (carpus) and usually continued thence down the middle line of the cannon-bone (metacarpus) to the front of the fetlock. (Himalayas.)
- b.* Prevailing colour grey or fawn-grey, more or less suffused with black; black spinal stripe usually wholly absent, when present not passing beyond withers (shoulders); tail black at the end; no black up back of thighs *goral*.
- b'*. Prevailing colour brown, more or less suffused with black; black spinal stripe present in adult and sub-adult examples, and extending at least on to the lumbosacral area; a black stripe down the upper side of the tail and an ill-defined black stripe running up the back of each thigh from the hock *hodgsoni*.
- a'*. Skin of tail about 5 inches long in adult; black stripe on fore leg not passing over the middle line of the knee (carpus), but turning aside at that area and commonly continued down the outer side of the cannon-bone (metacarpus) to the outer false hoof and thence on to the back of the fetlock and pastern. (North China to Arakan.)
- c.* Coat comparatively short and not woolly even in the winter; tail less bushy (tail-tuft black above and below; throat-patch more or less yellow, at least marginally)... *griseus**.
- c'*. Coat, at least in the winter, long, shaggy, and more or less woolly; tail-tuft long and copious (throat-patch without yellow).
- d.* Legs below knees and hocks nearly uniformly fawn in front and externally; tail-tuft black, much darker than the proximal portion of the organ and than the back of the body; a narrow white fringe of hairs bordering the tail below *caudatus*.
- d'*. Front of legs below knees and hocks to a certain but varying extent fuscous and contrasted in colour with the white or dirty-white tint of the feet; upper side of the tail the same colour as the back, but not wholly black; a broad white fringe bordering the tail below *raddeanus*.

* I suspect that *N. cinereus* A. M.-Edwards (Rech. Mamm. p. 362, pl. lxx. *et seq.*, 1874) from Eastern Tibet will prove to be at most subspecifically distinct from *N. griseus*, in spite of the differences in the skull and teeth pointed out by the describer. By Trouessart (Cat. Mamm. Suppl. p. 734, 1905) both of these Gorals are erroneously classified with the Serows.